



Reflux

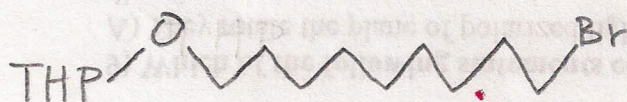
1) HBr/Toluene

2) Toluene



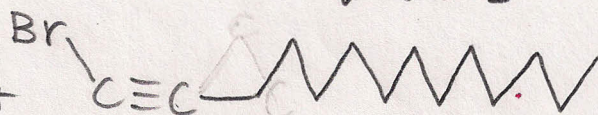
Cold

1) DHP/TsOH

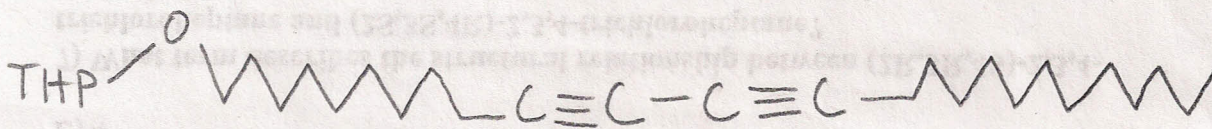


1) H-C≡C-H / NaNH<sub>2</sub>

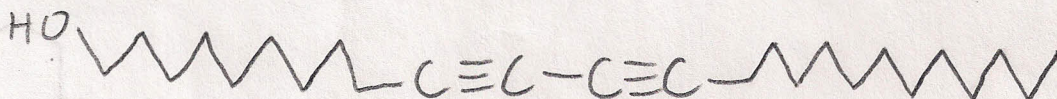
2) H-C≡C-H



1) CuBr / NaNH<sub>2</sub>

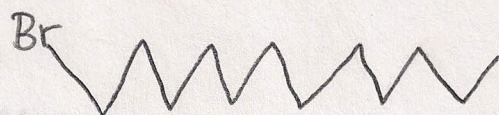
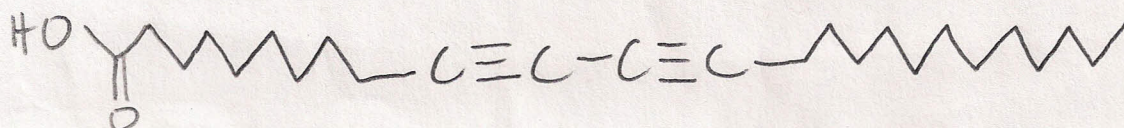


1) TFA



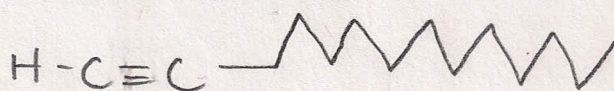
ice bath

1) Na<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub> / H<sub>2</sub>SO<sub>4</sub> / acetone / H<sub>2</sub>O



1) H-C≡C-H / NaNH<sub>2</sub>

H-C≡C-H



1) NaNH<sub>2</sub>  
2) Br<sub>2</sub>